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ARACHIS VEIGAE (FABACEAE), THE MOST DISPERSED WILD SPECIES OF THE GENUS, AND YET TAXONOMICALLY OVERLOOKED

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Summary: Santana, S. H. & J. F. M. Valls. 2015. *Arachis veigae* (Fabaceae), the most dispersed wild species of the genus, and yet taxonomically overlooked. Bonplandia 24(2): 139-150.

A new Brazilian species of *Arachis* L. is described. *Arachis veigae* S.H. Santana & Valls *nov. sp,* morphologically close to *A. pusilla* Benth., is distinguished by the absence of a prominent basal disc at the base of the fruit segments and non concaulescent cotyledonary buds. The synonymization of *A. sylvestris* (A. Chev.) A. Chev. and *A. pusilla* is discussed.

Key words: *Heteranthae*, Leguminosae, new species, taxonomy.

Resumen: Santana, S. H. & J. F. M. Valls. 2015. *Arachis veigae* (Fabaceae), la especie silvestre del género más dispersa, sin embargo pasada por alto taxonómicamente. Bonplandia 24(2): 139-150.

Se describe una nueva especie brasileña de *Arachis* L. *Arachis veigae* S.H. Santana & Valls *nov. sp,* que presenta afinidad morfológica con *A. pusilla* Benth., se diferencia de ésta por la ausencia de un disco prominente en la base de los artejos del fruto y por presentar yemas cotiledonares no concaulescentes. Se discute la sinonimización de *A. sylvestris* (A. Chev.) A. Chev. y *A. pusilla*.

Palabras clave: *Heteranthae*, Leguminosae, nueva especie, taxonomía.

Introduction

Arachis L. encompasses 81 species distributed in nine taxonomic sections (Krapovickas & Gregory, 1994; Valls & Simpson, 2005; Valls et al., 2013). Exclusively Brazilian, the section *Heteranthae* Krapov. & W.C. Greg. is comprised of six annual species, three of them only known from a single, or two quite close collection sites. They are concentrated in the semi-arid Caatinga biome, and in adjacent segments of the Cerrado, as well as in transitional environments. Some members of *Heteranthae* display a considerable degree of morphological variation (Veiga et al., 1994, 1996, 1999; Coelho et al., 2001).

From 1841, when the first taxonomic treatment of wild species of *Arachis* was published by Bentham, to 1958, the description of new taxa has consistently followed conventional approaches, based just on morphological differences. In many cases, only the aerial structures were analyzed. But, since 1960, each of the 62 subsequently described species has been previously characterized on cytogenetic grounds, and often their cross-compatibility with other taxa has been evaluated (Fernández & Krapovickas, 1994, Krapovickas & Gregory, 1960, 1974, 1994; Stalker, 1991; Peñaloza & Valls, 2005; Valls & Simpson, 2005).

Dedicating considerable attention to the

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genus *Arachis*, Chevalier (1929a) described a new taxon collected by Gregorio G. Bondar in the State of Bahia, Brazil, and deposited in the Paris Museum of Natural History, as *A. hypogaea* L. subsp. *A. sylvestris* A. Chev., a binary combination not admissible under the rules of Botanical Nomenclature (McNeill et al., 2012), to be altered to *A. hypogaea* L. subsp. *sylvestris* A. Chev. He described this plant as a slender annual species with tender roots, with leaflets elliptic, hairy on both faces and with ciliate margins up to a certain stage of ripening, looking quite like prostrate, hirsute forms of the cultivated groundnut. Later on (1929b), he decided to consider the new taxon at specific level, establishing the new combination *A. sylvestris* (A.Chev.) A. Chev. Compiling the available information on the genus *Arachis* in his "Monographie de l'Arachide", Chevalier (1933) distinguished *A. sylvestris* from *A. pusilla*, previously described by Bentham (1841), by the larger leaflets, hairy on both faces.

In 1957, Krapovickas & Rigoni considered *A. sylvestris* just a synonym of *A. pusilla*, on the basis of the original description, the photograph of the type specimen published by Chevalier (1929b, planche XIII), and the sympatric distribution. However, in the monographic treatment of the genus, Krapovickas & Gregory (1994) decided to accept *A. sylvestris* as a distinct species, characterized by flowers with orange standard with red lines only in the back. Based on the geographic distribution, annual life cycle, and the presence of dimorphic flowers, *A. sylvestris* was assigned by Krapovickas and Gregory (1994) to section *Heteranthae*, next to *A. pusilla*, although the presence of flowers with red lines only in the back of the standard was considered, otherwise, an attribute of section *Extranervosae* Krapov. & W.C. Greg.

In 1994, Veiga reported the results of his extensive morphological and isoenzymatic studies of germplasm accessions of *A. sylvestris*, conducted under field and laboratory conditions for a period of four years, and originally designed to include 18 natural populations of the species, covering its known area of occurrence. One of these accessions, *Valls et al.10969*, has been soon recognized as quite distinct, and suggested to belong to a new species of section *Heteranthae* (Veiga, 1994, Veiga et al., 1999), which was subsequently described as *A. seridoënsis* Valls, C.E. Simpson, Krapov. & R. Veiga (Valls & Simpson, 2005).

Veiga (1994) and Veiga et al. (1999) noticed the presence of a prominent basal disc in the fruit segments of the *Valls et al.10969* accession, and mentioned the occurrence of the same structure in *A. pusilla*, while it was absent in all other 17 accessions listed as representatives of *A. sylvestris*. Stressing that, among the diagnostic features of the taxon so named, Chevalier (1929a) had noted the presence of a prominent disc at the base of the fruits, Veiga (1994) raised the possibility that a new name might be required for the germplasm accessions identified at the time by the name *A. sylvestris*.

While describing the seedling morphology of a highly representative set of wild *Arachis* species, Carpes (2010) detected some features that are exceptional in the genus, as the most peculiar concaulescence of the cotyledonary buds, a character she found to be exclusive of two species of section *Heteranthae*.

In our recent taxonomic review of sections *Heteranthae* and *Triseminatae*, we monitored the behavior of the concaulescent cotyledonary buds from seed germination to plant establishment in 23 accessions of *A. pusilla* and in the only available accession of *A. seridoënsis*, the two wild *Arachis* species that show this developmental variation.

In most *Arachis* species, the two first lateral branches develop from buds located at the cotyledonary axils. The epicotyl is then very evident, in seedlings and adult plants, between these cotyledonary branches and the insertion of the two first normal leaves above (Fig.1A). But, in plants showing concaulescence, the cotyledonary buds are raised up to the base of the two first normal leaves, where the cotyledonary branches then develop. The epicotyl is visible, therefore, between the insertion of the raised primary branches and the level of insertion of the cotyledons below, identified either by the presence of the cotyledons themselves, or by scars left after their senescence and fall (Fig. 1B).

This very distinctive morphological detail can be quite easily recognized in adult plants, and even in old herbarium specimens.

The finding of evidences of concaulescence of the cotyledonary buds in the holotype of *A. sylvestris* (Fig. 2A), as well as the confirmation of the presence of a basal disc in its fruit segments (Fig. 2B), demanded a circumscriptional review of this and other taxa involved, through further morphological analysis.

Materials and Methods

Natural populations, herbarium specimens, and live plants cultivated in a screenhouse at Embrapa Recursos Genéticos e Biotecnologia, Brasília-DF, were observed from February 2011 to December 2014, concerning phenology and plant development. Seed for germination studies and plant establishment was provided by the Wild *Arachis* Genebank from the same institution.

Field expeditions included the states of Bahia, Ceará, Goiás, Minas Gerais and Piauí, for *in situ* observation of natural populations, collection of new germplasm accessions and herbarium materials, establishment of coordinates with GPS, as well as for the assessment of potential threats to plant populations. At least five herbarium specimens were prepared from each population, always trying to document distinct phenological stages. Seed harvest was intended to enrich the genebank and to provide new accessions for germination and screenhouse studies.

Twenty-three morphological descriptors were adapted from Carpes (2010), and applied to seedlings, once they reached five leaves, considering the length of the cotyledonary petiole, texture of the cotyledon, and aspect of its upper face, hypocotyl and epicotyl lenght, pigmentation and hairiness, presence or absence of concaulescence, enlargement or not of the internode between the first normal leaves, and the length of the internode between the second and third normal leaves, as well as measurements of stipules, petiole, proximal leaflets, rachis and distal leaflets, presence or absence of bristles, and plant height.

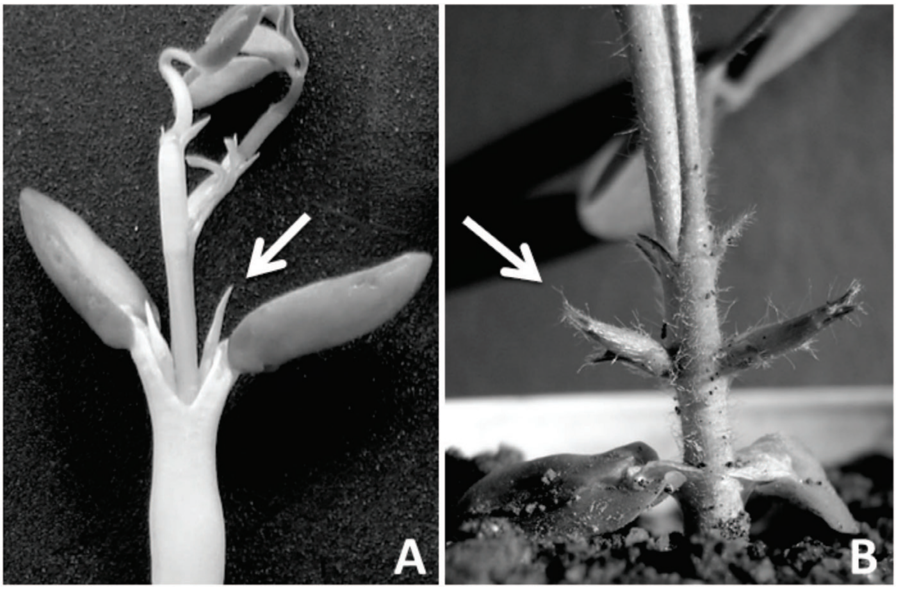


Fig. 1. *Arachis lignosa.* A: Seedling with the two cotiledonary buds (arrow) developing at the cotyledonary axils (*Valls et al. 13570*). Photo: J.F.M. Valls. *Arachis seridoënsis.* B: Raised cotyledonary buds (arrow) emerging at the base of the two first normal leaves, characterizing the concaulescence (*Valls et al. 10969*). Photo: G.M. Carpes.

At full growth, 58 descriptors adapted from Krapovickas & Gregory (1994), Veiga (1994) and Veiga et al. (2001), were applied to mature plants, already in their definitive pots, including measurements, as the total length of the mainstem and lateral branches, length, diameter, pigmentation and hairinees of internodes, measurements of stipules, petiole, rachis and leaflets in the mainstem and lateral branches, presence or absence of bristles in the stems and leaves. Flowers were classified in normal and minute ones, the latter certainly cleistogamic, and their descriptors included the position in the branches, length, diameter, and hairiness of the hypanthium, length and width of calyx lips, standard, wing and keel petals, peg lenght, fruit reticulation, and the presence or absence of a prominent nipple-like disc at the base of the fruit segments.

Our taxonomic approach is based on the direct analysis of the type specimens of *A. pusilla* (BM, K) and *A. sylvestris* (P), as well as in materials cited in the literature as belonging to these taxa, and the local study of additional specimens from BM, CEN, CTES, IAC, HUEFS, HVASF, K, MOSS, P, UB and UFRN. One isotype of *A. pusilla* from G and specimens deposited in NY were analyzed through digitized photographs available on line. Specimens from IAC were additionally studied in detailed pictures locally taken and made available to the authors by Dr. R. T. Queiroz. Herbarium acronyms follow Thiers (2015).

Results and Discussion

Compiling the fundamental information on the species studied, with detailed analysis of seedlings, adult plants, fruit segments, and herbarium specimens, including holotypes and isotypes of *A. pusilla* and *A. sylvestris*, our observations were concentrated on three main aspects:

1. *Concaulescence*: Evidences of concaulescence of cotyledonary buds, with a raised insertion of the cotyledonary branches, are remarkable in the holotypes

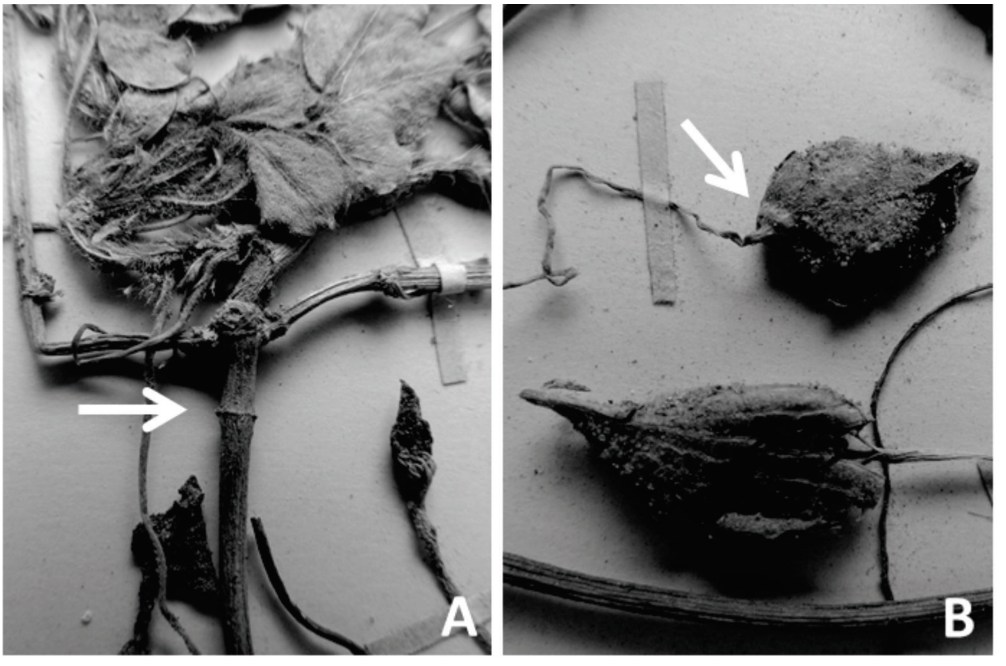


Fig. 2. Holotype of *Arachis sylvestris*. A: Scars left after senescence of the cotyledons (arrow) and branches arising from tip of elongated epicotyl, indicating concaulescence of the cotyledonary buds. B: Nipple-like disc at base of fruit segments. (*Bondar s.n.*, P). Photos: R. T. Queiroz.

of *A. pusilla* [http://apps.kew.org/herbcat/getImage.do?imageBarcode=K000205245] (Fig. 3A) and *A. sylvestris* [http://dsiphoto.mnhn.fr/sonnera2/LAPI/scanK/K20130117/P00836224.jpg], (Fig. 2A), but absent (Fig. 3B) in seedlings, as well as in live or herbarium specimens of the species widely recognized as *A. sylvestris* in the taxonomic and cytological studies published by Fernández & Krapovickas (1994), Krapovickas & Gregory (1994), Veiga (1994), Lavia (1996), Veiga et al. (1996, 1999), Lavia et al. (2008, 2009), and Silva et al. (2010).

2. *Basal disc*: The prominent disc at the base of the fruit, mentioned by Chevalier (1929a) among other attributes of *A. sylvestris*, is distinctly visible in the several well preserved proximal fruit segments of the holotype (Fig. 2B). Chevalier considered the fruits uniseminate (1929a, 1933), and so they appear in the holotype, obviously due to collapsing of the isthmus between segments and consequent separation of the distal segment at fruit maturity. In fact, the nipple-like disc is equally present at the insertion of the peg in the base of the proximal fruit segment, as at the insertion of the isthmus in the base of the distal one. But this morphological characteristic is absent in all herbarium specimens, as well as in fresh or even long-time harvested fruit segments of the species widely recognized as *A. sylvestris* in the above cited literature (Fig. 4A).

Fruit segments are not available in the holotype and in the isotypes seen of *A. pusilla* (*Blanchet 2669* BM, G, K). The presence of the disc in this species has been first mentioned by Veiga (1994), who included the accession *Valls et al. 6110* as a check in the isozyme analysis of widely distributed germplasm accessions of the species then called *A. sylvestris*. This feature could easily be observed in stored fruit segments of each of the twelve *A. pusilla* collections (*Valls et al. 6110*, *6655*, *6709*, *6773*, *6781*, *6785*, *7287*, *7289*, *10833*, *10837*, *10921*, *11022*) cited as selected additional materials of that species by

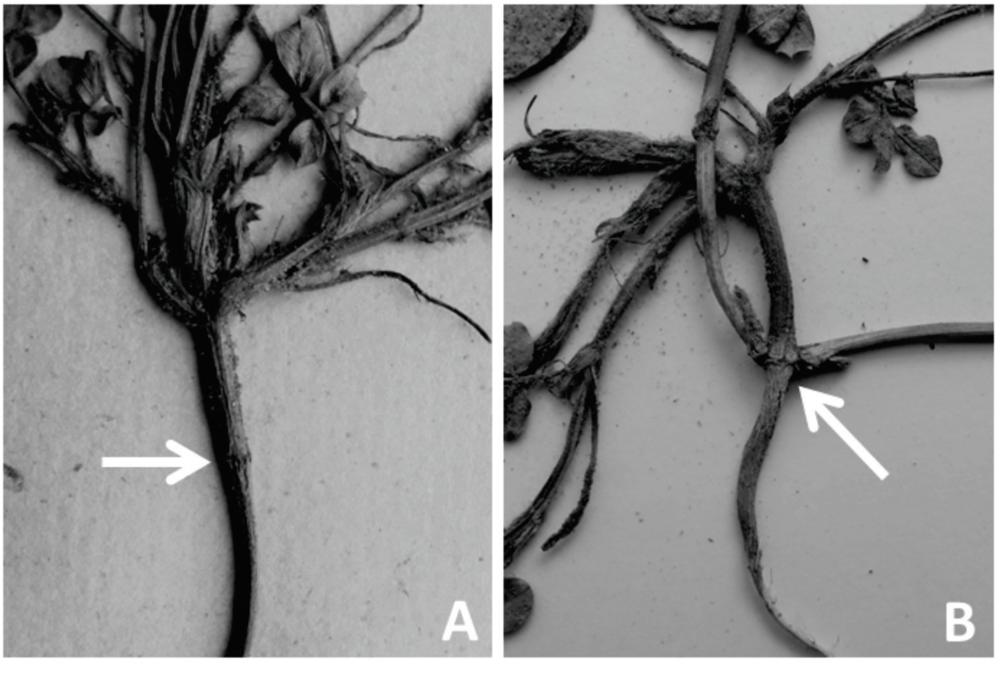


Fig. 3. Isotype of *Arachis pusilla* Benth. A: Scars left after senescence of the cotyledons (arrow) with a raised insertion of the cotyledonary branches, indicating concaulescence (*Blanchet 2669,* BM). Photo: R.T Queiroz. B: Herbarium specimen previously identified at CEN as *Arachis sylvestris,* with no evidence of concaulescence of cotyledonary buds. The scar of the cotyledons (arrow) is at the same level as the cotyledonary branches (*Santos et al. 2551*). Photo: S.H. Santana.

Krapovickas & Gregory (1994), and in many other populations (Fig. 4B), that also conform very well to the vegetative morphology of the holotype of *A. pusilla*.

3. *Leaflet hairiness*: Leaflets hairy on both faces were primarily considered a reliable feature to separate *A. sylvestris* from *A. pusilla* (Chevalier, 1933). However, recent field collections of *A. pusilla*, mostly in the States of Bahia and Minas Gerais, and closer examination and screenhouse cultivation of old collections with available germplasm, such as *Valls et al. 10921*, from Ceará State, brought to light a series of natural populations including plants with glabrous and others with hairy leaflet epiphyl. Therefore, "leaflets hairy on both faces" no longer stands as an exclusive character of *A. sylvestris*, or one that could separate the typical collection of *A. sylvestris* made by Bondar, in Bahia, from *A. pusilla*.

The three plants in the holotype of *A. sylvestris*, with hairy epiphyl, in fact show the prominent nipple-like disc at the base of their fruit segments, as described by Chevalier (1929a) and emphasized by Veiga (1994), as well as evidences of concaulescence.

From the comparison of the type specimens of *A. pusilla* and *A. sylvestris*, now available in pictures and high resolution digitized files, it can be concluded that the plant collected by Bondar in Bahia, and named *A. sylvestris* by Chevalier (1929a) is just a specimen of *A. pusilla* with hairy leaflet epiphyls. Once *A. pusilla* was described in 1841 and *A. sylvestris* in 1933, the name *A. sylvestris* must be accepted as a synonym of *A. pusilla*, corroborating the decision made by Krapovickas & Rigoni, in 1957.

Conclusion

In spite of being the wild species of *Arachis* with the broadest natural area of occurrence, the species incorrectly identified by the name *A. sylvestris* for several decades still lacks a name, a formal description, and the designation of a type specimen.

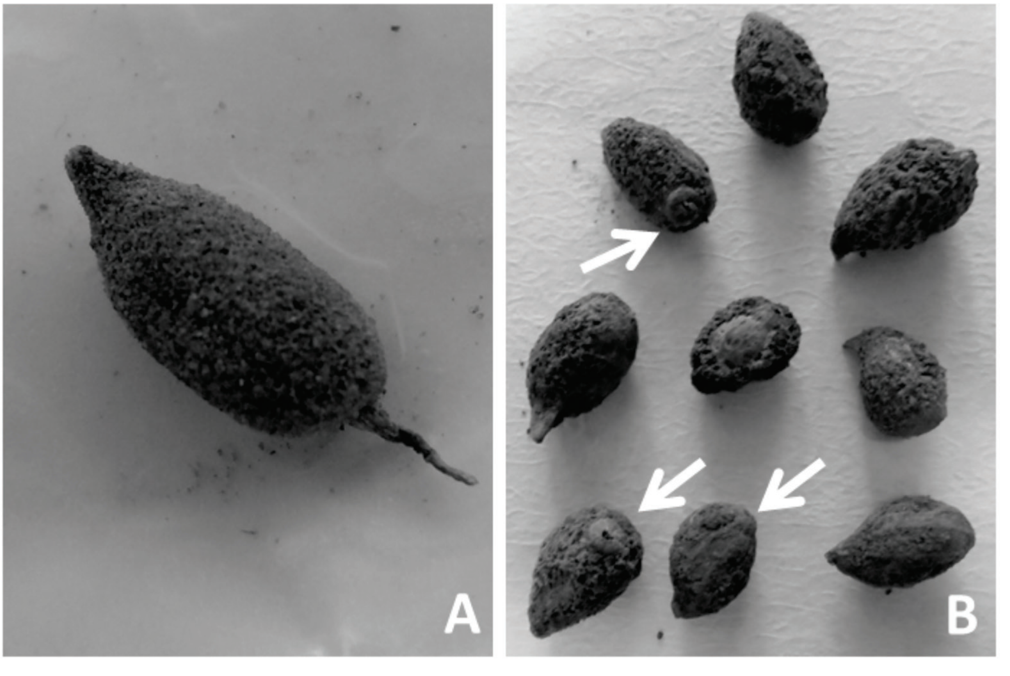


Fig. 4. *Arachis veigae*. A: Fruit segment of specimen previously identified at CEN as *Arachis sylvestris*, with absense of nipple-like disc at the base (*Valls et al. 13022*). *Arachis pusilla*. B: Fruit segments showing the nipple-like disc (arrow) at the base (*Valls et al. 6676*). Photos: S. H. Santana.

Arachis veigae S. H. Santana & Valls ***sp. nov.*** Fig. 5

Ab omnibus speciebus annuis notis generis vexillo striato solum dorsaliter differt.

Holotypus hic designatus: BRASIL. Goiás: Mun. Formosa, cerca de 1,5 km ao sul da Vila JK, na BR-020, em vale de pequeno rio, área fortemente ondulada de capoeira com bambusal, cerca de 10 m acima do rio, solo arenoso sobre morro de rocha calcária. Abundante. 15º13'21,19" S, 47º09'51,77" W, 595 m.s.m., 06-I-2014, *J. F. M. Valls, S. H. Santana*, *R. A. Rocha & M. R. Tosta 15861* (CEN, *Isotypes*: BM, BRIT, CTES, G, IAC, K, MO, MOSS, P, RB, SP, UB).

Herbaceous annual. Taproot weak, 2-3.06 mm in diameter, secondary roots 0.4-1.5 mm in diameter. Mainstem erect, 25-54.1 cm long. and 2.15-2.88 mm in diameter, cylindrical, villous, with hairs up to 3 mm, dense at the top of the stems; internodes 1.2-5.2 cm. Lateral branches prostrate or prostrate-ascendant, extending for 25 cm or longer, grabrescent toward the base, villous upward, with long hairs 2-3 mm long. Internodes 0.9-4.3 cm, villous. Leaves tetrafoliolate. Upper surface of the leaflets with uniformly scattered hairs, or rarely glabrous, eventually glabrescent at senescence. Lower surface with hairs more or less adpressed 1-2 mm long., some populations with scattered bristles. Secondary veins and margins barely marked. Margins entire, ciliate, with hairs 2-3 mm long. Leaflets large-elliptic to obovate, acute on apex and oblique at base. Estipules with wavy hairs ca. 3-4 mm long. and small hairs 1-2 mm. Aciculate apex. Petiole 1.4-2.8 cm long. on the mainstem and 1.4-1.7 cm on the lateral branches, villous, with hairs 2-3 mm, and rachis 0.9-1.5 cm long. Petiole groove separated of rachis by hairy line. Leaves on the mainstem somewhat larger than those of the branches. Leaflets of the apical pair 3.5-4,5 × 1.8-2,4 cm and 3.1-3.7 × 1.4-2.1 cm in the basal pair. Stipules in the mainstem 1.2-1.5 cm long in the adnate portion, 1.7-2.4 cm in the free portion. Leaflets in the lateral branches 1.3-2.4 × 1.3-1.5 cm in the apical pair, 1.2-1.9 × 0.8-1.1 cm in the basal pair. Stipules 7.6-9 mm long in the adnate portion, 10-15.5 mm in the free portion. Flowers in axillary inflorescences at the base of the mainstem and along the branches. Hypanthium 0.7-0.9 mm diam., greenish or reddish, villous, with scattered long, wavy hairs, and short hairs. Hypanthium 1-2.1 cm long in the expanded flowers and 1-4 mm in the smaller flowers; calyx greenish, bilabiate, villous, the upper lip with four laterally fused sepals, 3.2 × 2.7 mm and the lower lip 3.5 × 0.8 mm. Standard 8.7 × 10 mm in the expanded flowers and 5.4 × 4.7 mm in the smaller flowers, orange with yellow tint in the internal surface. External surface pale orange with red lines converging toward the base. Wings yellow 3.6-6.3 × 2-3.7 mm. Keel 6.5 ×1-1.3 mm. Fruit developed underground. Pegs 0.4-0.7 mm diam., growing horizontally slightly below soil surface, 28 cm long. or longer, with basal insertion in the proximal fruit segment. Articles 10.3-14.6 × 6.9-7.5 mm, slightly reticulated, acute apex, covered with a dense mat of short, panous hairs. No basal disc at the insertion of the peg on the fruit.

Cytological information: 2n= 20 chromosomes, 16 metacentric + 4 submetacentric, with punctiform satellite (type 10) (Fernández & Krapovickas, 1994; Lavia, 1996; Lavia et al., 2008, 2009; Silva et al. 2010)

Etimology: The epithet honors Renato Ferraz de Arruda Veiga, who intensively studied this species and raised the attention to morphological features that led to the clarification of the nomenclatural aspects.

Geographic distribution and ecology: *Arachis veigae* is the most dispersed wild species of the genus, with a documented area of natural occurrence including almost all states of the Brazilian Northeastern region, as well as Minas Gerais, Goiás and Tocantins. It forms natural populations of variable size, sometimes with scattered individuals, but eventually dense and covering large extensions. Occurs in woody, shruby, herbaceous or open areas in the Caatinga biome, in typical cerrado, cerradão,

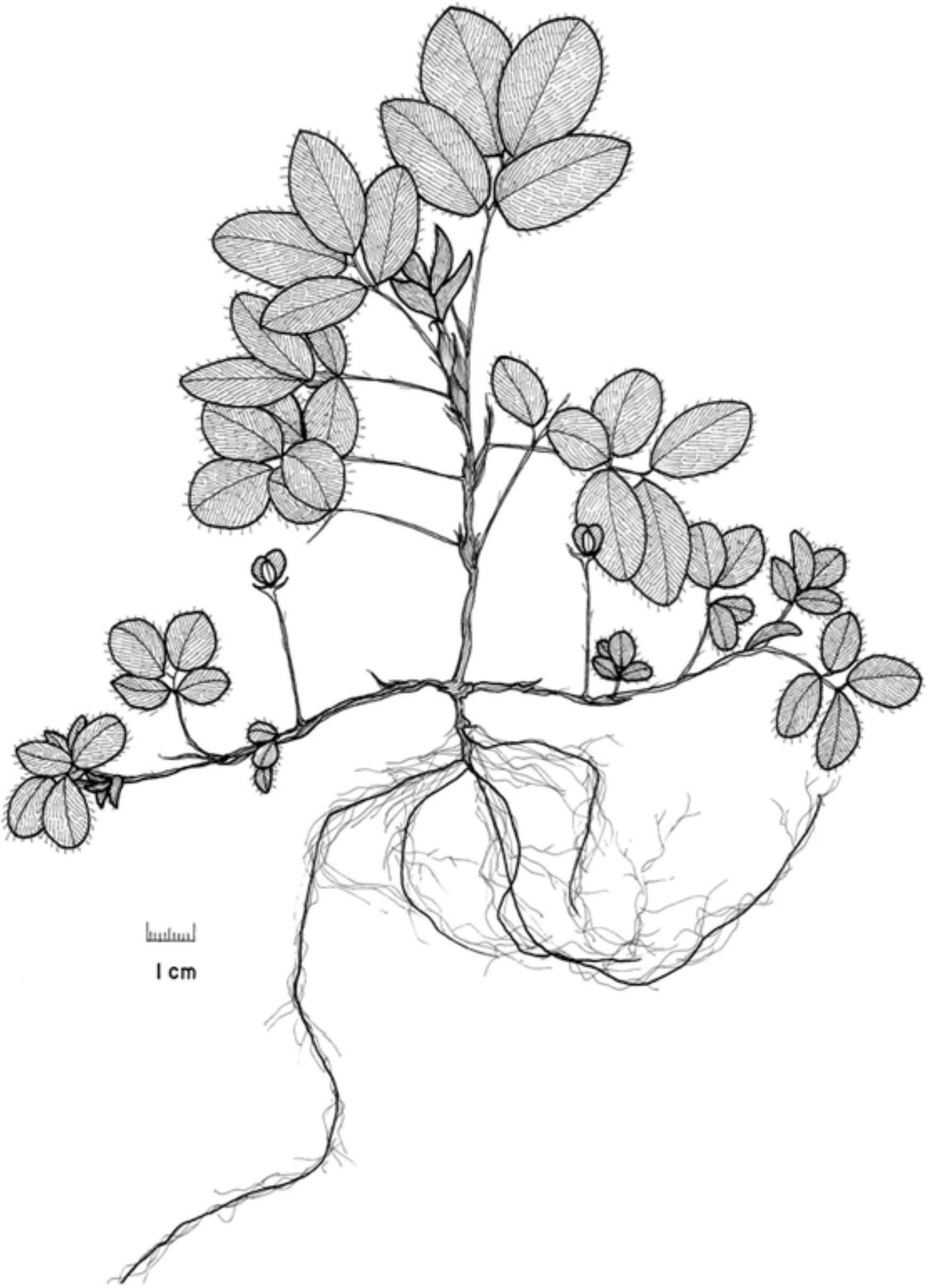


Fig. 5. *Arachis veigae* (*Valls et al. 6547*). Line drawing by R. F. A. Veiga.

open areas, veredas and river edges in the Cerrado biome, in disturbed sites, road edges, and other anthropic environments, as well as in Caatinga-Cerrado ecotones. It grows in a wide array of soils, from rocky to sandy and clay soils, either compact and with a strong structure to loose, without any structure sandy profiles. Occurs in flat or inclined, as well as in depressed areas. It is generally found with flowers from December to May, and with mature fruits from January to June, under field conditions.

Vernacular names: "amendoim do porco" (*Valls et al. 7191*); "mandubi do porco (*Valls et al. 7172*); "mundubim bravo" (*Valls et al. 8458*).]

Paratypi. **BRAZIL. Bahia:** Mun. Barreiras, 4 km E de Barreiras, road to Passagem and Ibotirama, 500 m, 6-III-1971, *Irwin et al. 31651* (UB)**;** pátio do Hotel Barreiras, 12°19'S, 45°W, 450 m, 31-III-1983, *Valls et al. 7037* (CEN, CTES); baixada ao N da rodovia, BR-242/BR-020, balneário do Rio de Ondas, 15-IV-1983, *Valls et al. 7294* (CEN, CTES). Mun. Correntina, Bairro Serra Dourada, saída para o Matadouro, 13º20'51"S, 44º37'22"W, 12-XII-2004, *Santos et al. 2551* (CEN); ao longo da rua lateral à Chácara Paraíso, no Setor Dourado, 13º20'48"S, 44º37'22"W, 30-III-2012, *Valls et al. 15680*, *15681* (CEN). Mun. Feira da Mata, 15 km a leste da saída de Côcos (ponte) para feira da Mata, plantas com eixo central, 14º11'20"S, 44º24'7"W, 552 m, 26-III-2012, *Valls et al. 15651* (CEN). Mun. Formosa do Rio Preto, 200 m N do Riacho Piripiri, estrada de Formosa a Corrente, 10º55'S, 45°14'W, 24-IV-1983, *Valls et al. 7081* (CEN, CTES). Mun. Inhambupe, Fazenda Gameleira, 11º50'40"S, 38°19'52"W, 27-VI-1993, *Valls et al. 13403* (CEN). Mun. Pindobaçu, 1 km N de Pindobaçu, estrada para Senhor do Bonfim, 10º44'S, 40º21'W, 390 m, 17-VI-1981, *Valls et al. 6180* (CEN, CTES, IAC); id., 19-IV-1987, *Valls et al. 10891* (CEN, CTES). Mun. Riachão das Neves, 16 km N do rio Cariparé, estrada Riachão das Neves a Formosa do Rio Preto, 1-IV-1983, *Valls et al. 7065* (CEN, CTES, K, P). Mun. Santa Rita de Cassia, 200 m N da saída para Santa Rita de Cassia, estrada de Barreiras para Corrente, 11°20'S, 44°56'W, 1-IV-1983, *Valls et al. 7071* (CEN, CTES). **Ceará:** Sem localidade, 1860-61, *Allemão s.n* (P). Mun. Caucaia, 3.9 km a leste do rio Cauipe, entre Guararu e Catuana, BR-222, 28-IV-1987, *Valls et al. 10993* (CEN, CTES, MBM). Mun. Tianguá, Unidade de Pesquisa de Ibiapaba/EPACE, 30-IV-1987, *Valls et al. 11020* (CEN, CTES); frente à Universidade do Vale do Acaraú, área do antigo Campo Experimental de Ibiapaba, na estrada para Viçosa, a 15 km da BR-222, área antropizada à margem de estrada, 3º43'58"S, 41º0'55"W, 26-VI-2012, *Valls et al. 15791* (CEN). **Goiás:** Mun. Formosa, cerca de 1,5 km ao sul da Vila JK, na BR-020 [*same site of type collection*], 10-VI-1981, *Valls et al. 6001* (CEN, CTES), 21-III-1982, *Valls et al. 6668* (CEN, CTES), 03-V-1982, *Valls et al. 6744* (CEN, CTES), 29-III-1983, *Valls et al. 7002* (CEN, CTES), 29-X-1984, *Valls et al. 7902* (CEN), 09-XI-1993, *Valls et al. 13423* (CEN), 13-XII-1995, *Valls et al. 13862*, *13869* (CEN), 31-I-1996, *Valls et al. 13876* (CEN), 15-II-1996, *Valls et al. 13880* (CEN), 06-I-2014, *Valls et al. 15862* (BM, BRIT, CEN, CTES, G, IAC, K, MO, MOSS, P, RB, SP, UB). Mun. Minaçu, afloramento rochoso, margem de rio, 18-IV-2001, *Silva et al. 4975* (CEN). Mun. Iaciara, 14º3'4"S, 46º50'13"W, 11-VI-1992, *Valls et al. 13306* (CEN). Mun. Teresina de Goiás, margem S do Rio Paranã, na estrada Teresina-Monte Alegre, 13º26'S, 47º8'W, 390 m, 12-V-1991, *Valls et al. 12901* (CEN). **Maranhão:** Mun. Balsas, 200 m E da ponte sobre o Rio Maravilha e 6 km NE de Balsas, BR-230, 19-III-1985, *Valls et al. 8403* (CEN, CTES). Mun. Barão do Grajaú, 100 m W da ponte sobre o Rio Parnaíba, na BR-230, para Floriano (Piauí), junto ao marco inaugural da ponte, 140 m, 6°46'S, 43°1'W, 7-IV-1953, *Valls et al. 7156* [epifilo glábro] (CEN, CTES, K, MO); id., 22-III-1985, *Valls et al. 8458* [epifilo glábro] (CEN, CTES). Mun. Carolina, BR-110, Cachoeira São Romão, km 5, 7º5'32"S, 47º23'7"W, 300 m, 15-I-2008, *Silva & Moreira 12669* (CEN). Mun. Caxias, 58 km NE da ponte sobre o Río Parnaíba, BR-316, 24-III-1985, *Valls et al. 8494* (CEN, CTES). Mun. Estreito, estrada que sai para W da BR-230, em frente ao cemitério de Estreito, cerca de 80 m da BR-230, 16-III-1985, *Valls et al. 8345* (CEN, CTES); 9,5 km ao norte de Carolina, na estrada para Estreito, 17-III-1985, *Valls et al. 8373* (CEN, CTES). Mun. Loreto, Ilha de Balsas, 7°23'S, 45°7'W, 5-IV-1962, *G. Eiten & L. Eiten 4005* (NY). Mun. Pastos Bons, 27 km NE de Pastos Bons, 21-III-1985, *Valls et al. 8442* (CEN, CTES). Mun. Riachão, 60 Km E de Carolina, na estrada para Estreito, 7º24'S, 46º53'W, 240 m, 17-III-1985, *Valls et al. 8386* (CEN, CTES, IAC).

Mun. São Domingos do Azeitão, BR-230, 20-III-1985, *Valls et al. 8437* (CEN, CTES). Mun. São Félix das Balsas, 70 km NE São Raimundo das Mangabeiras, BR-230, 20-III-1985, *Valls et al. 8435* (CEN, CTES). Mun. São João dos Patos, 2,5 km antes de Dois Irmãos e 25 km após São João dos Patos, na estrada de São João dos Patos a Floriano, BR-230, 6º35'S, 43º36'W, 21-III-1985, *Valls et al. 8451* (CEN, CTES). Mun. São Raimundo das Mangabeiras, 42,8 km do entroncamento em Fortaleza dos Nogueiras, estrada para São Raimundo das Mangabeiras, 7º3'S, 45º45'W, 350 m, 12-V-1988, *Bianchetti et al. 633* (CEN). Mun. Tasso Fragoso, 11,3 km de Tasso Fragoso (caixa d'água) na estrada para Alto Parnaíba, 310 m, 20-V-1991, *Valls et al. 13044* (CEN)**.** Mun. Timon, 10 km W da ponte para Teresina, Fazenda Bandeirante, 31-I-1981, *Krapovickas et al. 37215* (CEN, CTES, INPA, IPA, K, MO, P). **Minas Gerais:** Mun. Coronel Murta, Morro Redondo, *Valls et al. 13102* (CEN). Mun. Jaíba, 780 m do trevo de acesso ao centro do distrito de Mocambinho, 15º5'15"S, 44º1'9"W, 455 m, *Valls et al. 15637* (CEN). Mun. Juvenilia, 25 km desde o início da estrada Montalvânia-Juvenilia, a partir da BR-135, plantas com eixo central removido por pastejo, 14º16'57"S, 44º10'35"W, 472 m, 27-III-2012, *Valls et al. 15653* (CEN). Mun. Manga, ca. 1 km a sudeste da ponte sobre o rio Japoré, na BR-135, entre Manga e Montalvânia, 14°30'04"S, 44°04'45,2"W, 480 m, 29-X-2014, *Valls et al. 16039* (CEN). Mun. Pedras de Maria da Cruz, 3,8 km do Rio São Francisco, na BR-135, em direção a Montes Claros, 4-VI-1991, *Valls et al. 13104* (CEN). **Paraiba:** Sem localidade, em terrenos arenosos e xerofíticos, 25-V-1959, *Moraes 2127* (P). **Piauí:** Mun. Altos, 13 km NE de Altos, BR-343, 23-III-1985, *Valls et al. 8477* (CEN, CTES). Mun. Amarante, BR-343, entre Teresina e Floriano, km 40, 25-V-1980, *Coradin 2605* (CEN, CTES). Mun. Barreiras do Piauí, 39 km S de Gilbués, BR-135, 10º8'S, 45°13'W, 4-IV-1981, *Valls et al. 7126* (CEN, CTES, P). Mun. Castelo do Piauí, Percurso da Raposa, próximo à estaca 60, 5º13'S, 41º41'W, 200 m, 21-II-2004, *Costa & Coutinho 124* (HUEFS). Mun. Corrente, 500 m S da ponte sobre o rio Corrente, BR-135, 10º27'S, 45ºW, 460 m, 3-IV-1983, *Valls et al. 7105* (CEN, CTES). Mun. Cristino Castro, 35 km NE de Cristino Castro, BR-135, 8º36'S, 44ºW, 310 m, 27-III-1985, *Valls et al. 8520* (CEN, IAC). Dom Pedro II, BR-404, 34 km da ponte, na saída de Dom Pedro II para Poranga, Ceará, em vale, protegida pela vegetação, 44º33'S, 41º26', 480 m, 17-V-1988, *Bianchetti et al. 664* (CEN). Mun. Floriano, 1 km a leste da ponte sobre o rio Parnaíba, 170 m, 7-IV-1983, *Valls et al. 7165* [epifilo glábro] (CEN, CTES, P). Mun. Gilbués, 5 km S de Monte Alegre do Piauí e 7 km N de Gilbués, BR-135, 520 m, 4-IV-1983, *Valls et al. 7130* (CEN, CTES). Mun. Itaueira, 5,5 km N de Itaueira, PI-140, 27-III-1985, *Valls et al. 8516* (CEN, CTES). Mun. Cristino Castro, 35 km NE de Cristino Castro, BR-135, 8°36'S, 44°W, 310 m, 5-IV-1983, *Valls et al. 7144* [epifilo glábro] (CEN, CTES, K). Mun. Nazaré do Piauí, 300 m N do acesso leste de Nazaré, BR-230, 210 m, 6°50'S, 42°41'W, 7-IV-1983, *Valls et al. 7172* [epifilo glábro] (CEN, CTES); 7 km E de Nazaré do Piauí, BR-230, 300 m, 7-IV-1983, *Valls et al. 7176* (CEN, CTES, K). Mun. Oeiras, 3 km W de Oeiras, na estrada para Floriano, 7º1'S, 42º9'W, 200 m, 8-IV-1983, *Valls et al. 7180* (CEN, CTES); acesso ao aeroporto de Oeiras, 8-IV-1983, *Valls et al. 7191* (CEN, CTES). Mun. Piripiri, 700 m SW do Rio dos Matos, 30-IV-1987, *Valls et al. 11027* (CEN, CTES). **Rio Grande do Norte:** Mun. Açu, 25-IV-1987, *Valls et al. 10980* (CEN). **Tocantins:** Mun. Filadelfia, junto à porteira da Fazenda Laginha, 24,8 km a SW da balsa sobre o Rio Tocantins, 7º25'43"S, 47º48'43"W, 220 m, 19-V-1991, *Valls et al. 13022* (CEN). Mun. Guarai, 2 km S de Guarai, BR-153, 200 m N de um pequeno rio, 8°51'S, 48°31'W, 7-III-1982, *Valls et al. 6547* (CEN, CTES, IAC, NY). Mun. Palmeirante, mata de babaçu, na saída de Palmeirante para Barra do Ouro, margem esquerda do Rio Tocantins, 7º51'53"S, 47º56'11"W, 156 m, 7-III-2005, *Silva et al. 9861* (CEN, UFMT). Mun. Paranã, margem direita do Rio Tocantins, 12º51'30"S, 48º12'3"W, 260 m, 23-III-2007, *Silva & Moreira 11452* (CEN). Mun. Porto Nacional, Avenida Beira Rio, frente à Catedral Nossa Senhora das Mercês, próximo à barranca do rio, 10º42'29"S, 48º25'7"W, 320 m, 15-VIII-2005, *Valls et al. 15161* (CEN). Mun. Tocantinópolis, BR-226, km 1192 (56 km NE de Wanderlândia), 6º38'S, 47º34'W, *Valls et al. 6575* (CEN, CTES, MO, NY).

Arachis pusilla. *Materials examined.* **BRAZIL. Bahia:** Prov. Bahia, Serra Jacobina, 1837, *Blanchet 2669.* Type specimen. (K! *holotype* of *Arachis pusilla* Benth.) [A recent institutional label adds Blanchet's initials J.S., not written in the

original one]. Brasilia, prope Jacobina, *Blanchet nº 2669*. Isotype specimen (BM-photo!). Serra Jacobina, Bahia, Brasil, 1838 [*sic*]. *Blanchet 2669*, isotipo G (CTES!) [Digitized photograph available in the Internet of a herbarium sheet from CTES (http://plants.jstor.org/specimen/viewer/ctes0000584?p=1). The sheet includes two distinct photographs with equal labels "*Arachis pusilla* Benth. Blanchet 2669, isotypus (G)". Other labels refer to distinct locations in Bahia State. The one in the right photo mentions "Serra Jacobina", while the other cites "villa de Barra, Brésil". Nowadays a municipality, the village of Barra is located west of the Serra Jacobina, at the edge of the São Francisco river]. Etat de Bahia, 1929, *Bondar [s.n.]*. Type (P! *holotype* of *Arachis sylvestris* (A. Chev.) A. Chev. = *A. pusilla* Benth.). Brésil, État de Bahia, 1929, *Bondar [s.n.]*. Type. (P! Reçu le 2 Septembre 1931) [*Isotype* of *A. sylvestris* (A. Chev.) A. Chev. = *A. pusilla* Benth.]. Mun. Barra [nowadays Muquém do S. Francisco], BR-242, 11 km W da ponte sobre o rio São Francisco, 12°12'S, 43°20'W, 16-IV-1987, *Valls et al. 10833* (CEN, CTES). Mun. Oliveira dos Brejinhos, 38,1 km NE de Ibotirama, caminho a Seabra, 12°2'S, 42°57'W, 16-IV-1987, *Valls et al. 10837* (CEN, CTES). Mun. Paratinga, 21,2 km S de Ibotirama na estrada para Paratinga, 12°21'S, 43°13'W, 360 m, 14-III-1981, *Valls et al. 6110* (CEN, CTES); id., flores diminutas, 19-III-1982, *Valls et al. 6655* (CEN, CTES, K, P); id., flores normais e diminutas, 14-IV-1983, *Valls et al. 7287* (CEN, CTES); 42,8 km S de Ibotirama na estrada para Paratinga, 7-V-1982, *Valls et al. 6773* (CEN, CTES); id., 14-IV-1983, *Valls et al. 7289* (CEN, CTES); 13 km S de Paratinga na estrada para Bom Jesus da Lapa, 7-V-1982, *Valls et al. 6781* (CEN, CTES). Mun. Santa Maria da Vitoria 14 km a leste do rio Corrente na estrada de Santa Maria da Vitoria a Bom Jesus da Lapa, 13°23'S, 44°5'W, 450 m, 9-V-1982, *Valls et al. 6785* (CEN, CTES). **Ceará:** Mun. Missão Velha: 19,7 km a leste de Barbalha, caminho a Missão Velha, 7°15'S, 39°10'W, 22-IV-1987, *Valls et al. 10921* (CEN, CTES). **Minas Gerais:** Mun. Coronel Murta: 8,2 km S do rio Jequitinhonha, na estrada de Coronel Murta a Araçuai, 16°41'S, 42°10'W, 23-IV-1982, *Valls et al. 6709* (CEN, CTES). Mun. Jequitaí, 50 m ao norte da ponte sobre o rio Jequitai na faixa de dominio nos dois lados da estrada (BR-365), 17º12'55"S, 44º28'02"W, 21-IV-1982, *Valls et al. 6676* (CEN, CTES, MBM). **Piauí:** Mun. São João da Fronteira, margem esquerda do rio Genipapo, no lado norte da BR-222, km 26,4, 3°59'S, 41°24'W, *Valls et al. 11022* (CEN, CTES, K, P).

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